

(Model.)

3 Sheets—Sheet 1.

A. E. FRANCIS.  
Engraving Machine.

No. 238,882.

Patented March 15, 1881.

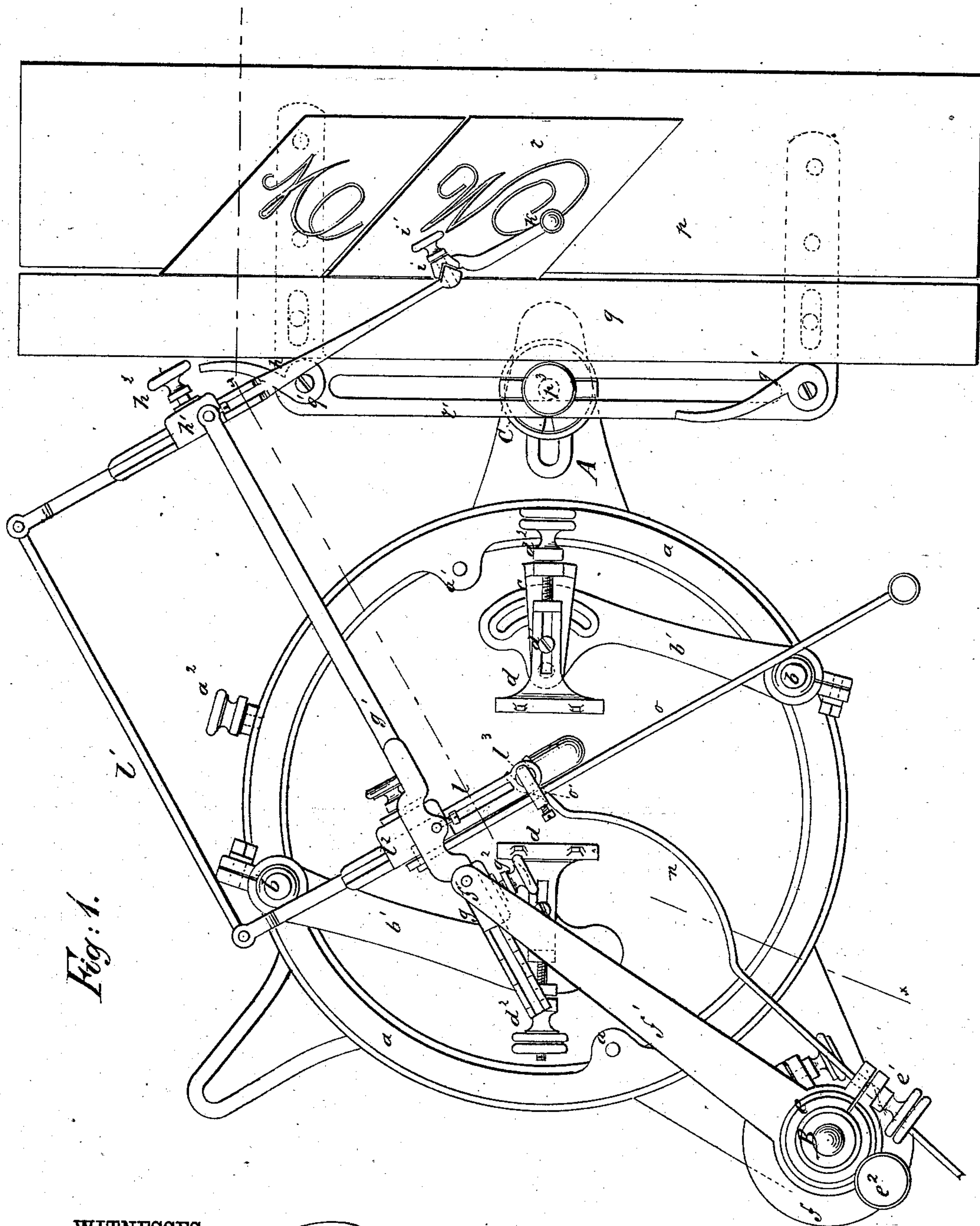


Fig. 1.

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INVENTOR:

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ATTORNEYS.

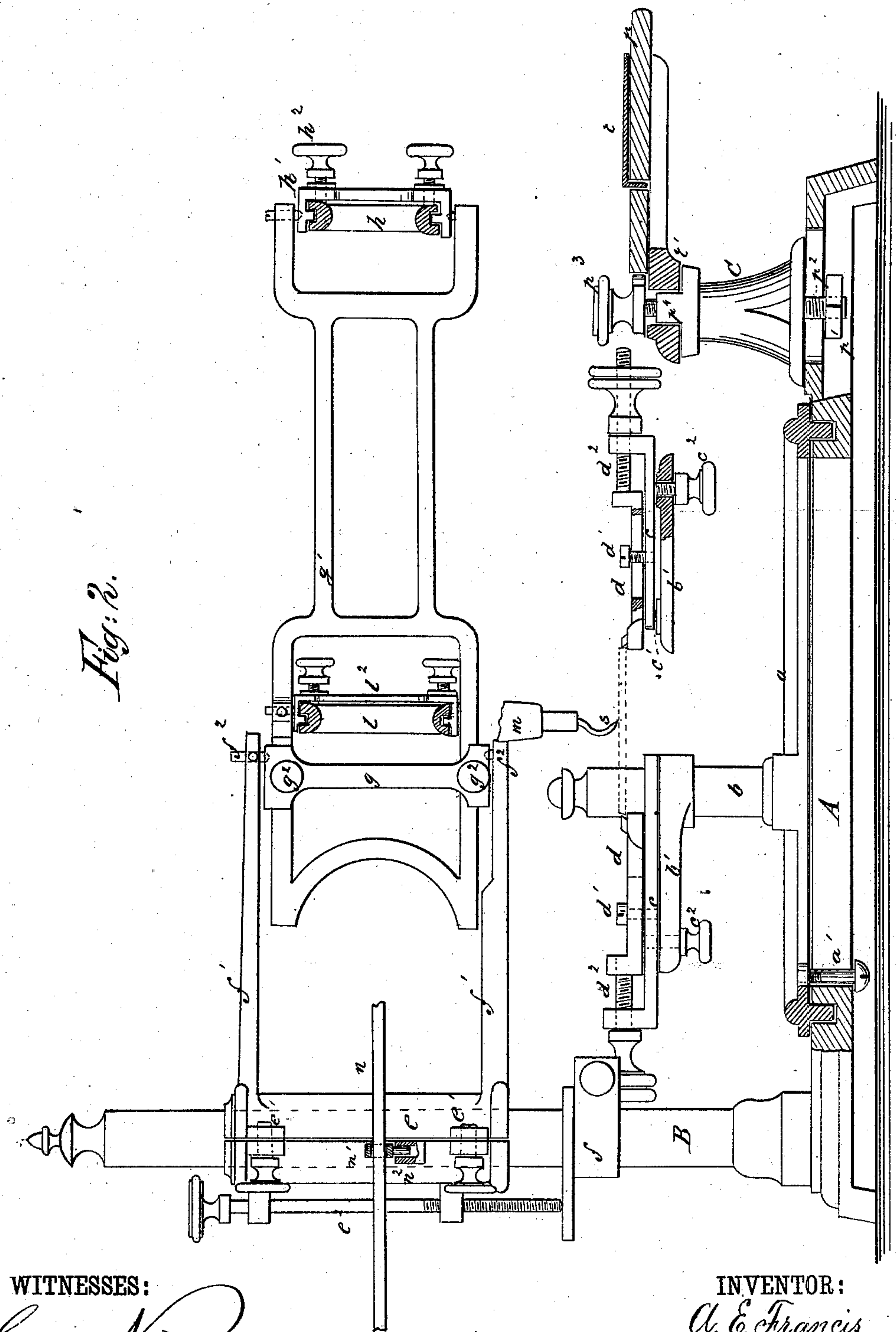
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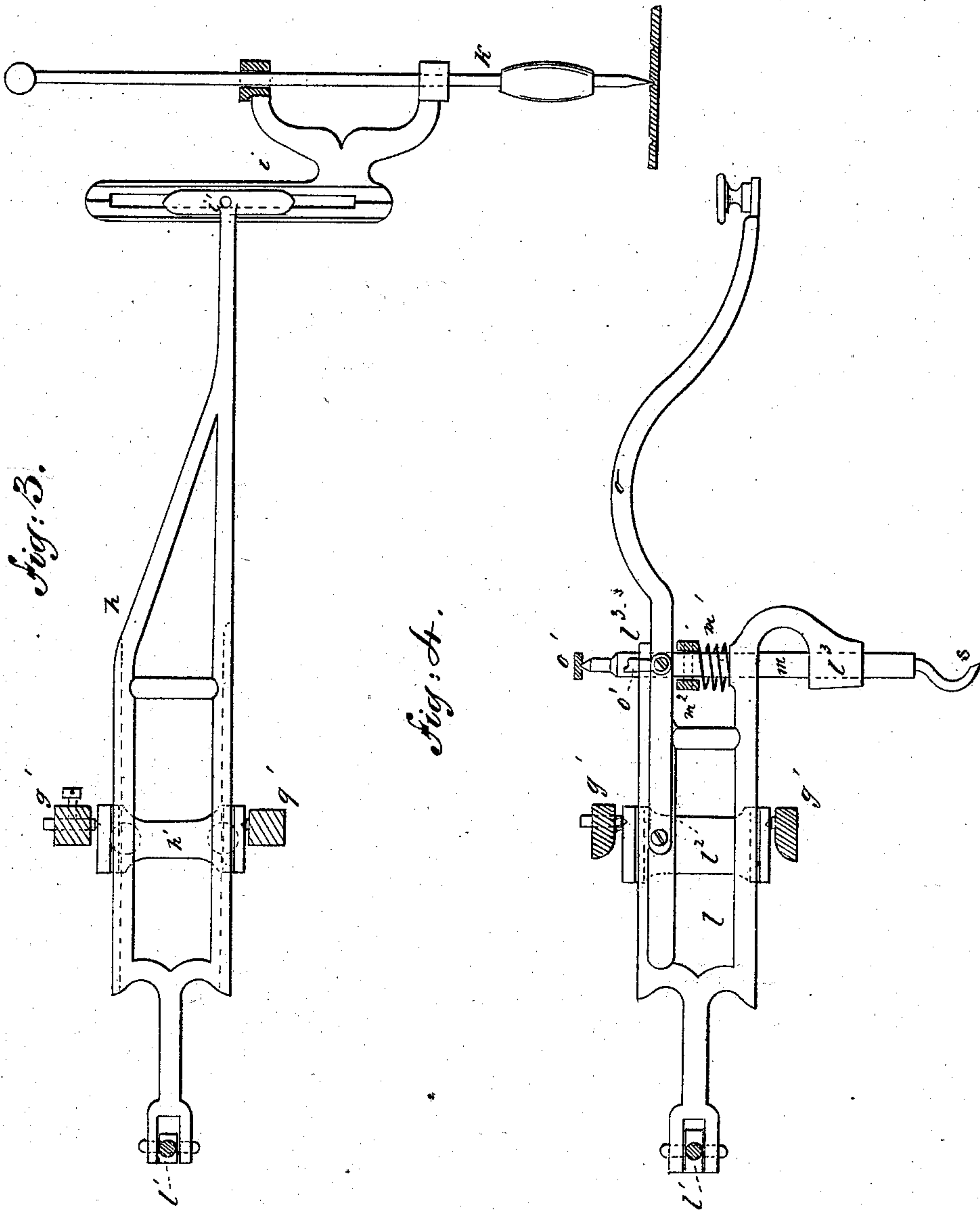
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WITNESSES:

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# UNITED STATES PATENT OFFICE.

ALLAN E. FRANCIS, OF GARRETTSVILLE, OHIO.

## ENGRAVING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 238,882, dated March 15, 1881.

Application filed April 12, 1880. (Model.)

*To all whom it may concern:*

Be it known that I, ALLAN E. FRANCIS, of Garrettsville, in the county of Portage and State of Ohio, have invented new and useful  
5 Improvements in Engraving-Machines, of which the following is a specification.

My improvements relate generally to engraving-machines employing a pantograph to which are connected the tracer and the grav-  
10 ing-tool, and particularly to the means for facing the tool properly and the lever for operating the tool to the construction of the pantograph; to the construction of the tracer-arm and the means for adjusting the tracer;  
15 to the bed and supports of the machine, and the means for adjusting the pantograph and the work, all of which features will be particularly described with reference to the accompanying drawings, forming part of this  
20 specification.

In the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a vertical section on line *xx* of Fig. 1. Fig. 3 is a side elevation of the tracer-arm and tracer; and Fig. 4 is a  
25 side elevation of the tool-carrying arm.

Similar letters of reference indicate corresponding parts.

A is the main bed of the machine, formed with a circular slideway that receives the  
30 ring-shaped bed *a*, from which rise the posts *b b*, that carry the supports for the work next described. The posts *b* carry arms *b'*, that are sustained on the posts by clamping-collars, and upon the arms *b'* are plates *c*, pivoted at  
35 *c'*, so as to swing in horizontal planes. Upon the plates *c* are clamps *d*, held by screws *d'*, passing through slots in the clamps, so that the slots may slide lengthwise, and in flanges of plates *c* there are fitted screws *d<sup>2</sup>*, connected  
40 with the clamps *d* for moving them, as required. The arms *b'* are also fitted with set-screws *c<sup>2</sup>*, passing through curved slots in the arms and entering the plates *c* for clamping the said plates in any position to which they  
45 may be turned on their pivots. The ring-bed *a* turns freely on bed A, and is prevented from rising by pins or screws *a'*, which are fixed at the inner side of the ring and take hold by their heads beneath bed A. In the side of  
50 bed A is a set-screw, *a<sup>2</sup>*, for clamping the ring in position. This construction permits the

work to be clamped between the clamps *d* in any required position within the areas of the ring-bed *a*.

From the bed A at one side rises the post 55 B, which carries the tool, pantograph, and tracer, arranged as next described. Upon the post B is a sleeve, *e*, which is split lengthwise and connected by screws *e'*, by which the sleeve is clamped to the post. One portion of the  
60 sleeve *e* is formed with lugs in which is tapped a screw-rod, *e<sup>2</sup>*, the lower end of which bears upon the flange of a collar, *f*, that is fitted on the post B, beneath sleeve *e*, so that when the screws *e'* are loosened the sleeve *e* and its at-  
65 tached parts are supported on collar *f*, and may be raised and lowered by turning the screw *e<sup>2</sup>*. The other portion of sleeve *e* is formed with arms *f'*, in which is pivoted, by pins *f<sup>2</sup>*, the yoke *g*, that carries the long arm  
70 *g'* of the pantograph. The arm *g'* is fitted to slide endwise in grooves of the yoke *g*, the set-screws *g<sup>2</sup>* serving to clamp it in position, and the outer end of arm *g'* is forked to receive the pivoted yoke *h'*, in which the tracer-arm *h* is  
75 fitted. The arm *h* is formed with grooves, (shown most clearly in Figs. 2 and 3,) which engage with tongues in the yoke *h'*, so that the tracer-arm *h* may be moved endwise, the screws *h<sup>2</sup>* tapped in yoke *h'* serving to clamp  
80 the arm *h*. The outer end of arm *h* is formed with a flange or head having a V-shaped face, (see Figs. 1 and 3,) which flange carries a sliding piece, *i*, that is held by a screw, *i'*, pass-  
85 ing into the arm *h* through a slot in piece *i*, so that the latter is rendered vertically adjustable. In suitable bearings in piece *i* the tracer *k* is fitted, so that it may slide freely up and down.

The tool or graver arm *l* is hung by a yoke, 90 *l<sup>2</sup>*, in the long arm *g'* of the pantograph, near the pivots *f<sup>2</sup>*, in the same manner as the tracer-arm. (See Figs. 2 and 4.) The rear ends of the tracer-arm *h* and tool-arm *i* are connected by a rod, *l'*, which is pivoted by a knuckle-joint 95 to each, and forms the short arm of the pantograph.

The tool stock or carrier *m* is fitted in bearings *l<sup>3</sup>* of arm *l*, which bearings permit vertical movement, and the tool is raised by a  
100 spring, *m'*, which is placed around the stock and bears between the arm *l* and a collar, *m<sup>2</sup>*,



on the stock. (See Fig. 4.) The collar  $m^2$  is pivoted upon the tool-stock, and is formed with or attached to an arm,  $n$ , which has upon it a loose collar,  $n'$ , that has a projection for entering the apertured lug  $n^2$ , that projects from the sleeve  $e$ , so that while the tool-stock is moved by the pantograph the arm  $n$  keeps the tool faced, or in the proper position for cutting.

10 Upon the tool-arm  $l$  is hung a lever,  $o$ , which extends to a position for convenient use, and bears at its mid-length, by a pivoted piece,  $o'$ , upon the upper end of the tool-stock, so that by pressure of the operator's hand on lever  $o$  the tool is forced down to the work.

15 The bed for carrying the pattern is supported by a tubular post,  $C$ , which is sustained on bed  $A$  by a screw-rod,  $p^2$ , and nuts  $p' p^3$ , as shown in Fig. 2, so as to be capable of adjustment radially as to the ring  $a$ .  $p$  is the bed, attached upon a supporting-piece,  $r'$ , that is slotted to set over a lug,  $p^4$ , on the upper end of post  $C$ , so that the bed may be moved lengthwise. The nut  $p^3$  serves to clamp the piece  $r$  in any position to which it may be moved, and the post  $C$ , with the piece  $r'$  and the bed  $p$ , may turn on the rod  $p^2$ .

20 The bed  $p$  consists of a fixed portion and a loose piece,  $q$ , that is movable to and from the fixed portion. Upon the supports of the bed there are hung cam-levers  $q'$ , fitted to bear on the outer edge of the piece  $q$ , for forcing the same toward the fixed bed. The patterns shown at  $r$  are formed with flanges that project downward between the fixed and movable portion of bed  $p$ , so that by operation of the cams  $q'$  they may be clamped firmly. The tool  $s$  is clamped by its shank in the stock  $m$ . The shank is formed with a backward curve above the point, in shape the arc of a circle, so that the face of the tool projects forward, in which position it is retained by the arm  $n$ .

25 In operation the work to be engraved will be placed between the clamps  $d$ , and by adjustment of the ring  $a$ , arms  $b'$ , and plates  $c$  may be fixed in the desired position. The arms  $f'$  will be adjusted vertically on the posts  $B$ , so that the tool shall be retained normally free from the surface of the work, and horizontally, as required. The sleeve  $e$  is then to be clamped firmly to the post  $B$ . The long arm of the pantograph is then to be adjusted

lengthwise in the yoke  $g$ , and the tracer and tool arms in their respective yokes  $h'$  and  $l^2$ , according to the reduction of the pattern that is required. The movements of the tracer are given to the tool by the long arm  $g'$  and short arm  $l'$  of the pantograph, and the tool being at the same time pressed down by the lever  $o$  the pattern is reproduced upon the work, the depth of cut being regulated by the pressure.

This construction furnishes a compact machine having a wide range of adjustment and affording great convenience for its operation.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. In engraving-machines, the arm  $n$ , combined with the tool-stock  $m$  and the sleeve  $e$ , substantially as shown and described, for the purpose of facing the tool.

2. In engraving-machines, the sleeve  $e$  and its tightening-screws  $e'$ , the screw-rod  $e^2$ , and flanged collar  $f$ , combined together and with the fixed post  $B$ , substantially as and for the purposes specified.

3. In engraving-machines, the ring-bed  $a$ , carrying the work-clamps, combined with the fixed bed  $A$ , having a circular slideway and provided with a clamping-screw,  $a^2$ , substantially as shown and described.

4. In engraving-machines, the pivoted plates  $c$ , sliding clamps  $d$ , and screw  $d^2$ , combined with the swinging arms  $b'$ , posts  $b$ , and ring-bed  $a$ , substantially as shown and described.

5. In engraving-machines, the tracer-arm  $h$ , formed with a V-shaped flange, the piece  $i$ , correspondingly concaved, and the screw  $i'$ , combined for operation substantially as and for the purposes specified.

6. In engraving-machines, in combination with the fixed bed  $A$ , the rod  $p^2$  and nuts  $p^3 p'$ , the tubular post  $c$ , and slotted support  $r'$  of the pattern-bed  $p$ , substantially as shown and described.

7. In combination with the bed  $p$  and its adjustable support  $r'$ , the sliding piece  $q$  and cams  $q'$ , substantially as and for the purposes set forth.

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Witnesses:

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JENNY L. FRANCIS.